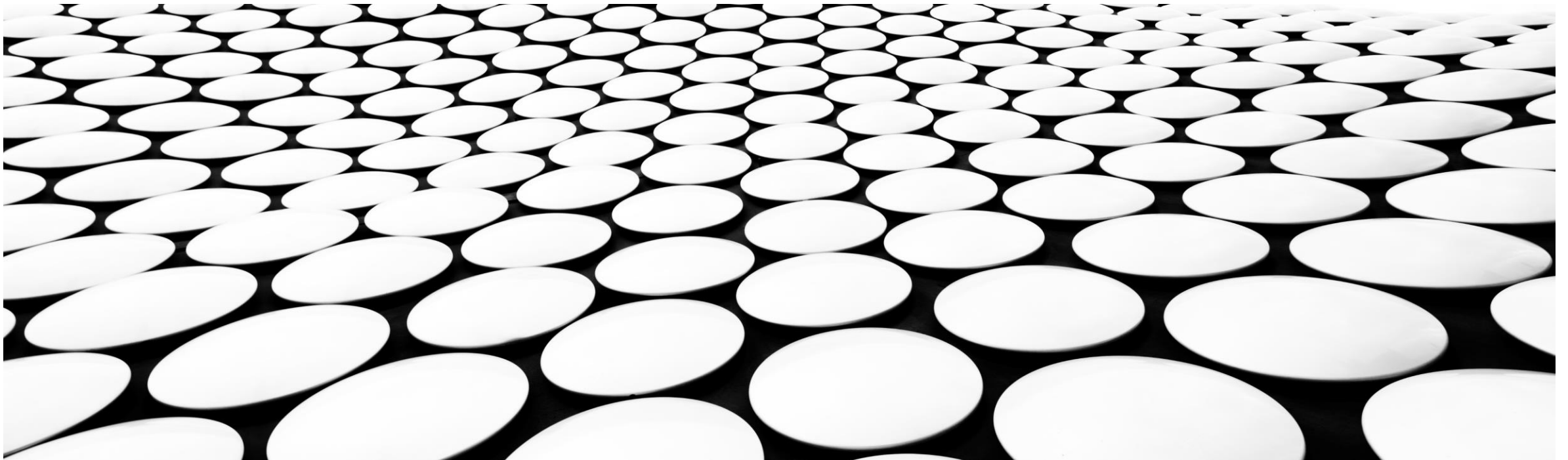# AER – Expert evidence sessions – 17 February 2022

DR JONATHAN MIRRLEES-BLACK

Contents

- Market risk premium – stability and drivers (for presentation)

- Market risk premium – measurement (for presentation)

- Cross Checks (contribution to the discussion)

Market risk premium – stability and drivers

AER questions

- What is your view on the weight of evidence about whether the MRP varies through time?

- If you think the evidence suggests that the MRP varies through time, how does it vary?

Views on the stability of MRP have evolved
Approach should be based on the empirical evidence

- Academic opinion has shifted. Previously, MRPs considered stable, with variation in prices due to variation in expectations. That is not the current thinking. A shift marked by John Cochrane's 2011 Presidential Address to the American Finance Association

- Finance theory provides no conclusive evidence on whether MRP or equity returns are stable

- We must therefore rely on the empirical evidence

- Two measures of MRP and asset returns:

  - Historic equity returns vs safe rates. We look here at evidence from Australian and international markets

  - Forward looking estimates of expected returns. We look at evidence from Australian and US markets

Extracts from John Cochrane's 2011 AFA Presidential address:

All price dividend ratio volatility corresponds to variation in expected returns. None corresponds to variation in expected dividend growth, and none to "rational bubbles". In the 1970s we would have guessed the exact opposite.

Discount rates vary over time. ("Discount rate", "risk premium" and "expected return" are all the same thing here).

The market premium isn't always 6%,but varies over time by as much as its mean.

Discount rates vary a lot more than we thought. Most of the puzzles and anomalies that we face amount to discount rate variation we don't understand...We need to recognize and incorporate discount rate variation in applied procedures."

The historic MRP over 10 year periods, Australia, 1892 – 2020

- Historic MRP is not stable over the whole period

- It is relatively stable from around 1900 to 1971

- There is a step down in 1970s, followed by a period of increased volatility

- There is both structural and cyclical variation

Nominal 10 year rolling returns – bonds, equities and MRP
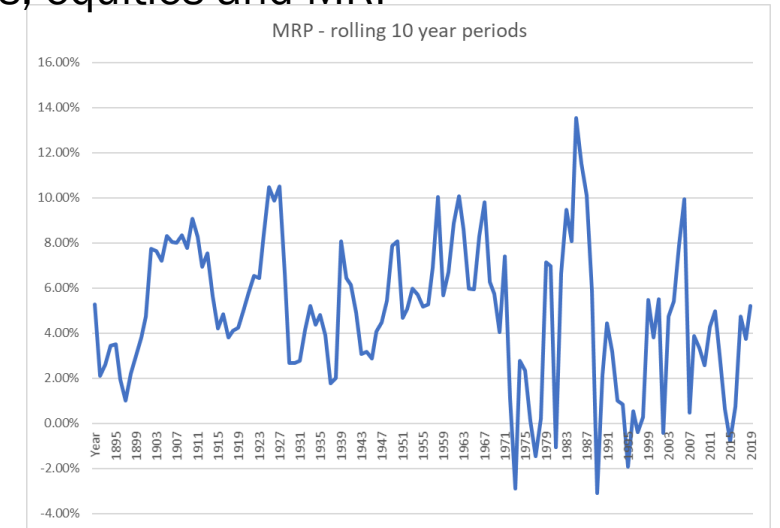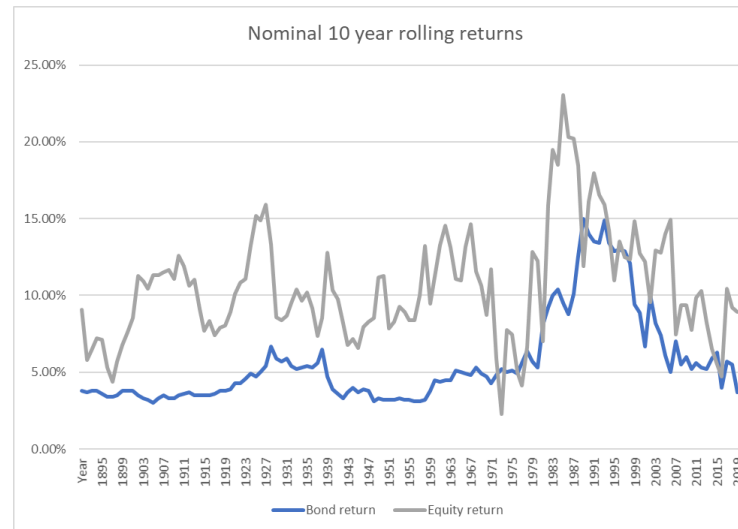
Nominal 10 year rolling returns
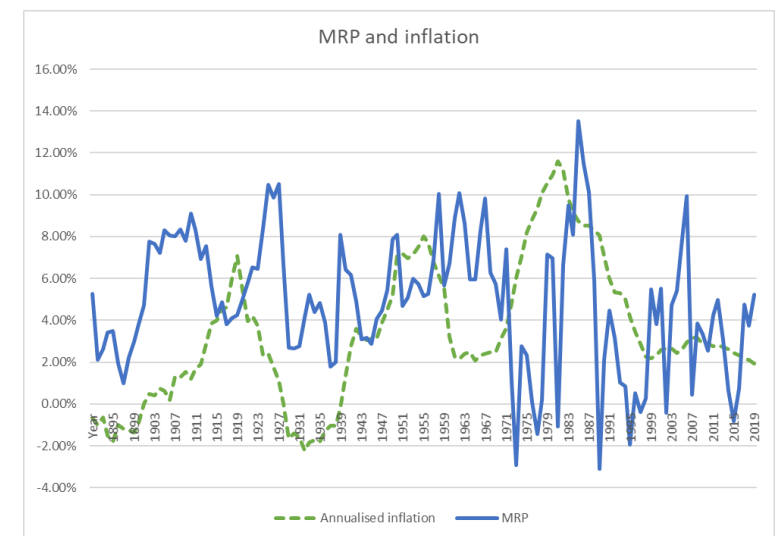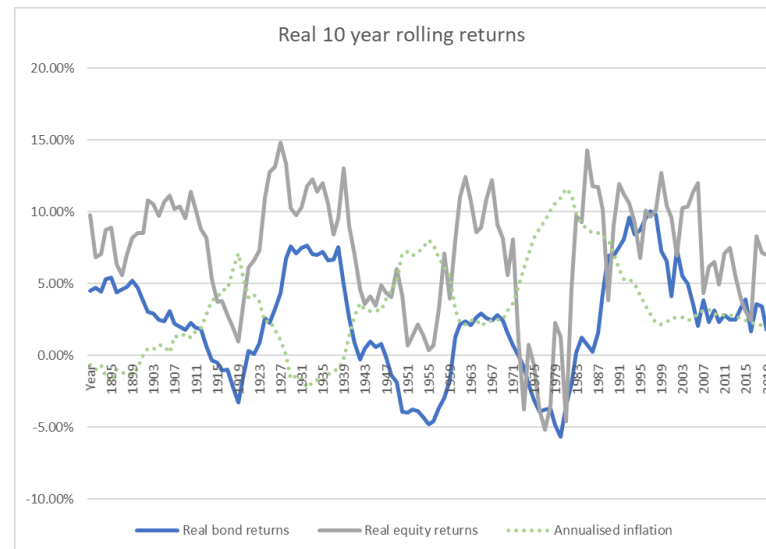

MRP - rolling 10 year periods

Analysis of data sourced from AER.

Returns are measured for successful 10 year CAPM investment periods, so bond returns are the yield with a 10 year lag and are risk free over the period, inflation is the CAGR of the CPI over the previous 10 years.

Real bond returns, real equity returns, and average inflation over rolling 10 year periods

- Inflationary periods have had massive impact on real returns to investors

- There have been three periods of relatively high inflation, likely unanticipated

- Period of low and stable inflation since central bank inflation targeting has raised real bond returns and led to fall in realised MRP

Real 10 year rolling returns – bonds, equities and MRP

Analysis of data sourced from AER.

Returns are measured for successful 10 year CAPM investment periods, so bond returns are the yield with a 10 year lag and are risk free over the period, inflation is the CAGR of the CPI over the previous 10 years.

Real equity returns positively related to real bond returns, but not 1:1

- Historic MRP has a weak negative relationship to real bond returns

- Historic real equity returns have a positive relationship to real bond returns, slope is 0.6

MRP (y) vs real 10 year bond returns (x)

Real 10 year equity returns (y) vs real 10 year bond returns (x)
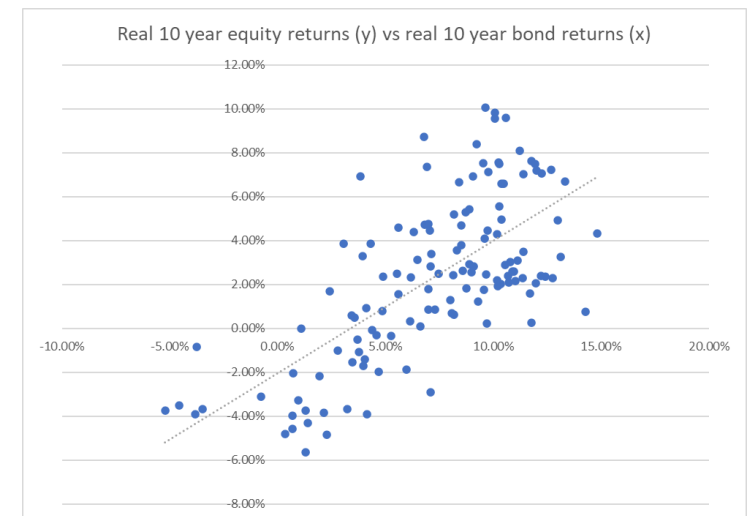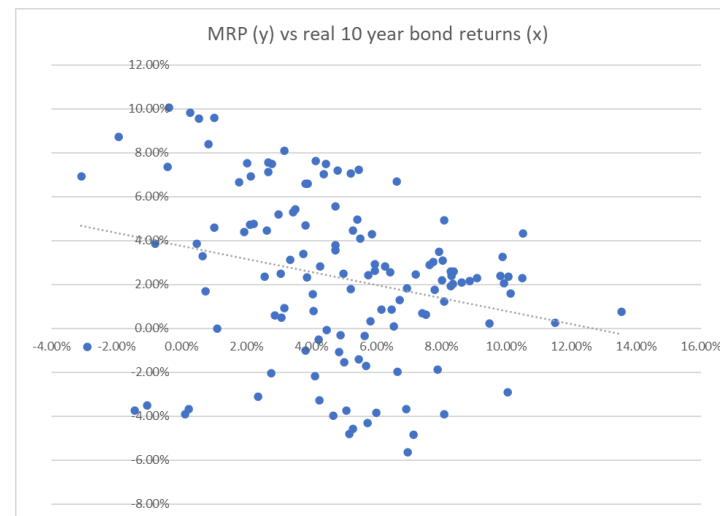
Analysis of data sourced from AER.

Returns are measured for successful 10 year CAPM investment periods, so bond returns are the yield with a 10 year lag and are risk free over the period, inflation is the CAGR of the CPI over the previous 10 years.

Strong relationship between historic equity and bond returns and inflation MRP appears to be a residual

MRP (y) and inflation (x)

Real equity returns (y) and inflation (x)
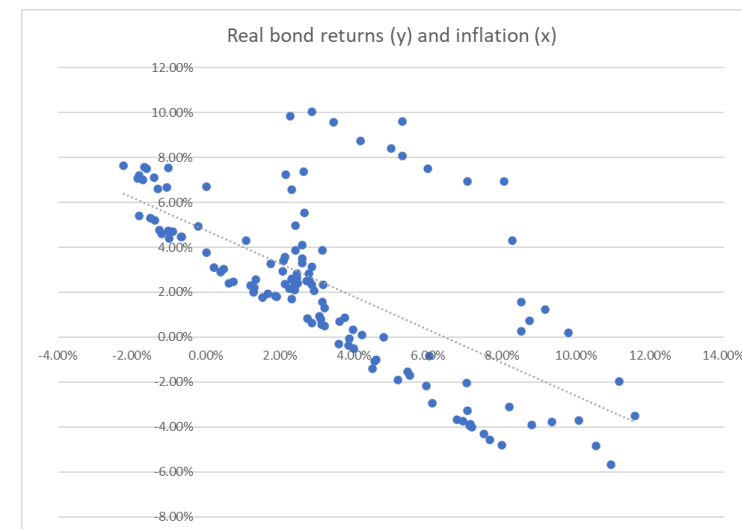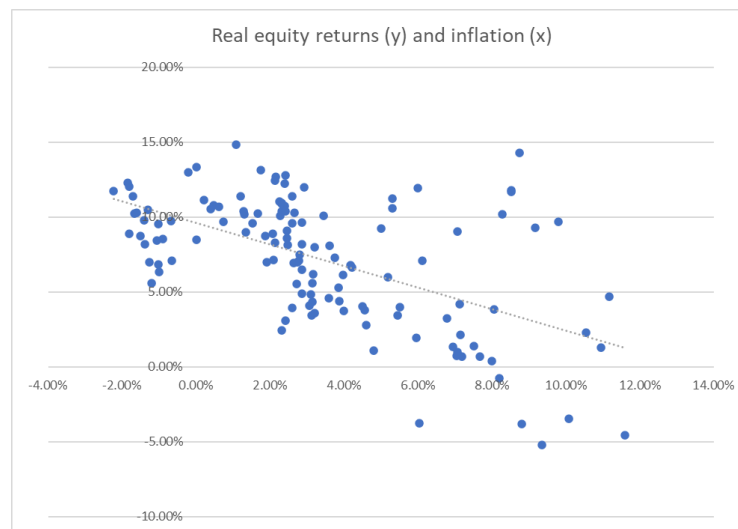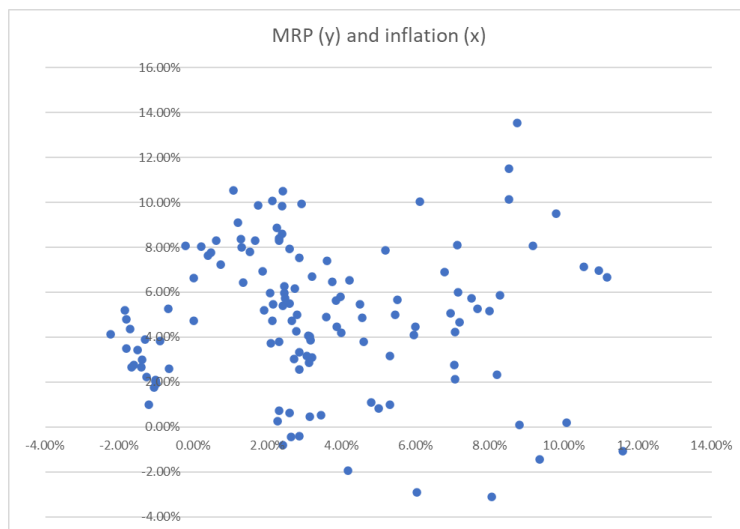
Real bond returns (y) and inflation (x)

Analysis of data sourced from AER.

Returns are measured for successful 10 year CAPM investment periods, so bond returns are the yield with a 10 year lag and are risk free over the period, inflation is the CAGR of the CPI over the previous 10 years.

International evidence on historic risk premia is similar to that of Australia

- Jordà et al (2019) estimate returns on different assets for 16 countries over a long time period

- "the risky return is largely stable across time" (p1297)

- "throughout most of the historical period…risky and safe returns [have been]…positively correlated…This positive correlation has weakened over more recent decades and turned negative from the 1990s onward"
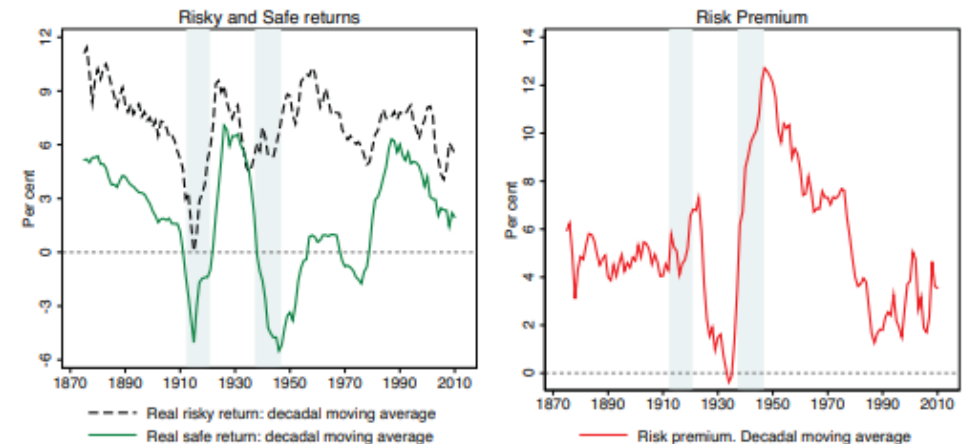
FIGURE XIII

Global Real Risky versus Real Safe Return

Mean returns for 16 countries, weighted by real GDP. Decadal moving averages. Within each country, the real risky return is a weighted average of equities and housing, and the safe return is a weighted average of bonds and bills. The within-country weights correspond to the shares of the respective asset in the country's wealth portfolio. Risk premium = risky return – safe return.

Òscar Jordà, Katharina Knoll, Dmitry Kuvshinov, Moritz Schularick & Alan Taylor (2019). The rate of return on everything, 1870 – 2015. *Quarterly Journal of Economics, p1225-1928.*

Forward looking evidence from dividend discount model for Australia

Figure 5.2: MRP (vertical axis) vs nominal bond yield (horizontal axis). MRP measured as DGM cost of equity estimate (based on outturn data) minus nominal bond yield. DGM assumes long-term growth equal to 40-year average of GDP growth.

$y = -1.26x + 0.13$
$R^2 = 0.79$

1917-2016

$y = -1.10x + 0.09$
$R^2 = 0.91$

1993-2016
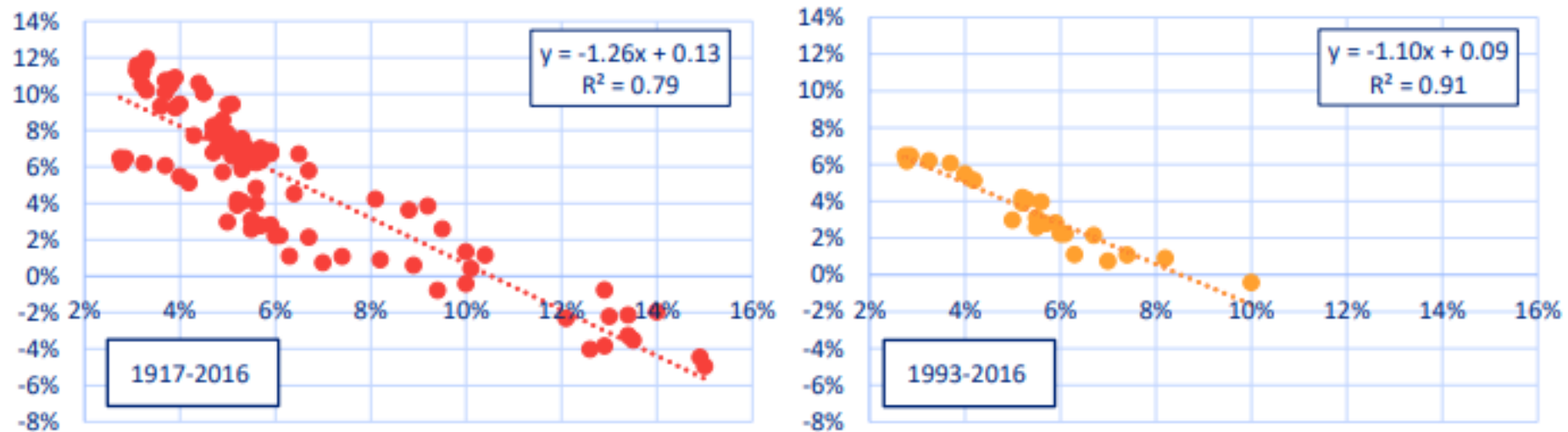
Source: CEPA analysis of data sourced from RBA and Thomson Reuters Eikon

Forward looking evidence from dividend discount model for USA

Figure 5.9: Damodaran's implied ERP premium (FCFE) vs RfR

Left chart (1961-2020): $y = -0.01x + 0.04$, $R^2 = 0.00$

Right chart (1993-2020): $y = -0.67x + 0.07$, $R^2 = 0.75$
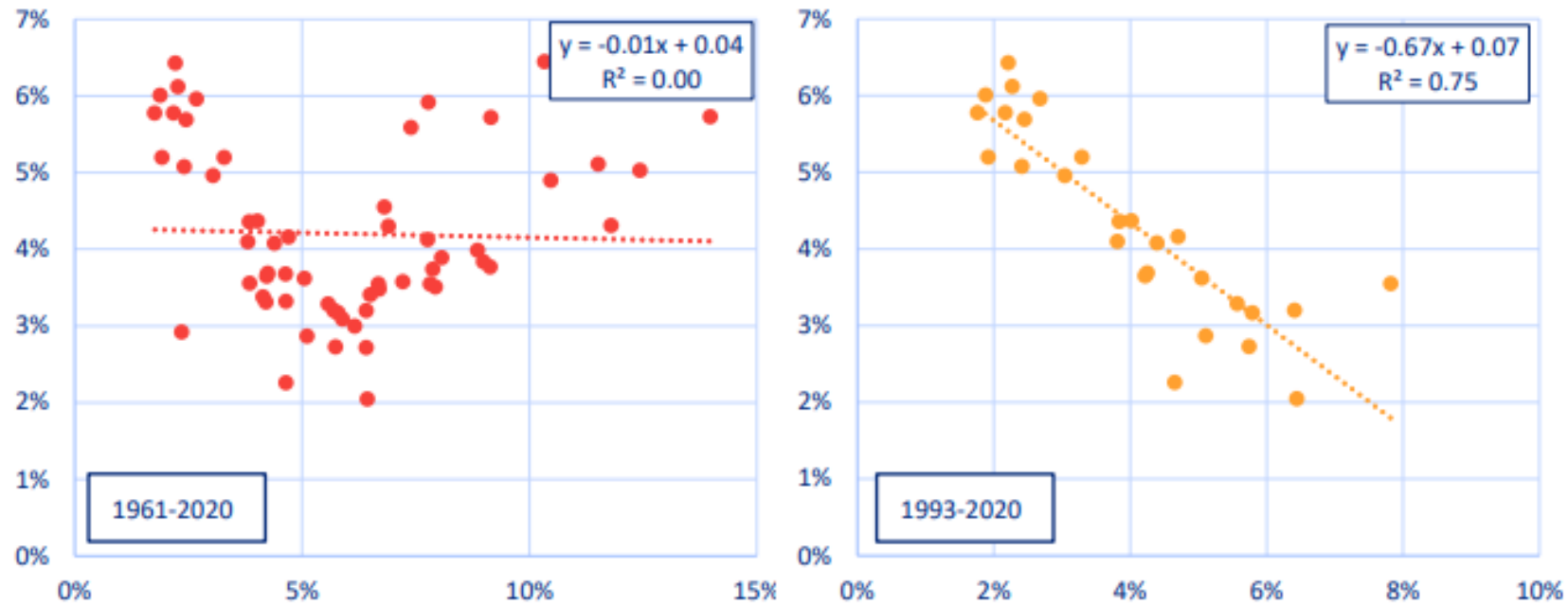
Source: CEPA analysis of Damodaran (2020)

CEPA (2021). Relationship between RFR and MRP. Report for AER, 16 June 2021.

Conclusions

The evidence

- There is significant cyclical variation to the MRP

- There is also structural variation, with material differences in average MRP in different periods

- Underlying structural changes in the economy are likely to play an important role in this such as:
  - Inflation targeting by central banks since the 1990s
  - Demographic changes leading to increasing demand for safe assets

- MRP is less stable than return on equity

- Return on equity shows a closer relationship to other economic variables than MRP

Implications

- Consideration should be given to estimating the return on equity rather than the MRP, or at least placing weight on methods that do this

- Consider whether AER is setting RORI
  - based on a structural estimate of returns
  - or reflecting cyclical factors (consistent with e.g. a 5 year term)

  Present approach is a mixture of structural and cyclical, with a measure of the current risk free rate (cyclical) but and MRP based on the long term (structural)

- A change in AER policy would reflect both a change in the empirical evidence and evolution of academic thinking on the stability of MRP
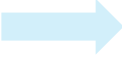
Market risk premium – measurement

AER's questions

- Is the long-run estimate of historical excess returns the best estimate of the MRP?

- Can we derive a better estimate by incorporating other information? If so, how?

- What are the challenges we would need to overcome in giving weight to other information?

Is the long-run estimate of historical excess returns the best estimate of the MRP?

- Do historic excess returns measure the variable of interest (forward looking returns)?

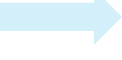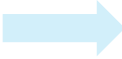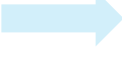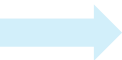 → ■ Historic returns do not measure expected forward returns, but may provide insights into expectations

- Have there been structural changes in returns? Will the future be like the past?

  → ■ There have been significant relevant structural changes including risk free rate, expected and realised inflation, and productivity growth

- Does the AER intend to provide networks with "through the cycle" returns, or does it aim for determinations to reflect cyclical moves in MRP?

  → ■ Not clear. But crucial for what is appropriate to use as a "best estimate". And cycles can be long lasting

- Is the historic MRP the metric we should measure, or would Total Market Returns a better economic variable from which we would deduct a current measure of the risk free rate?

  → ■ Evidence suggests that TMR is more stable, and should either be used in place of MRP or weight placed on both approaches

- Do investors exclusively use historic MRP to determine their expectations of returns

  → ■ No

Market risk premium = forward looking premium return for investing in equities over long term bonds

Are equity market returns predictable over the medium term?

- Relationship between market valuation ratios and forward excess returns well-known

- Used to develop asset growth projections in portfolio construction

- Academic support from Robert Shiller's body of work among others

- Recall John Cochrane's AFA address: yields predict returns not higher growth

CAPE-based 10-year forecast of real equity returns versus actual returns, December 1981-September 2020
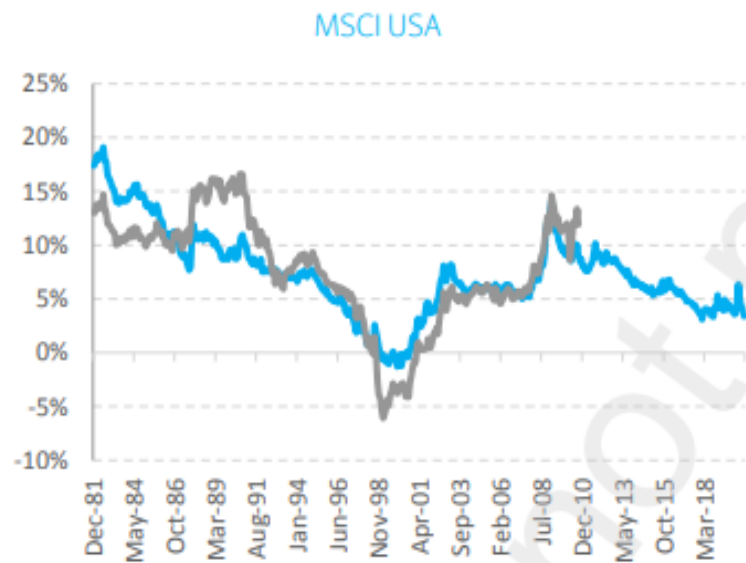
Developed market equities, 10-year returns (annualised) vs starting valuations, 1973-2011
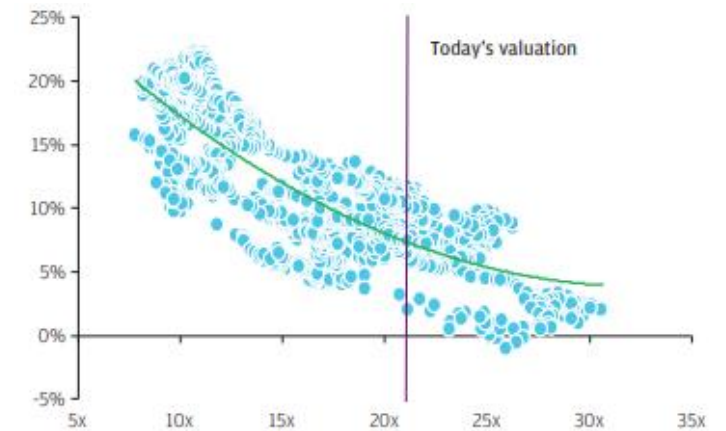
Source: Datastream, J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 30, 2021.

Robert Shiller, Laurence Black & Farouk Jivraj (2020). CAPE and the COVID-19 Pandemic Effect. Barclays, 19th October 2020. Available on SSRN.

J.P. Morgan (2021). Long-term capital markets assumptions. 2022 – 26th Edition. 2022 Long-Term Capital Market Assumptions Full Report (jpmorgan.com)

Can we derive a better estimate by incorporating other information? If so, how?

Dividend growth model

- Estimated returns reflect forecasts of dividends and long run growth

- Widely used to construct measures of equity market risk premia. Examples include Bank of England, ECB, RBA, financial market strategists, investors

- Regulatory precedent for use as part of the information set for determining the cost of equity and/or MRP

Capital market assumptions models

- Estimated returns reflect market valuation data which predict forward looking returns

- 10-year returns estimated as yield + earnings growth + valuation change, typically assuming mean reversion of valuation ratios (and currency change if appropriate)*

- Widely used in portfolio construction

- No evidence of use for regulatory determinations. AER may make use of the input data as "conditioning variables"

*For example see Research Affiliates (2014). Equity methodology overview. Available at www.researchaffiliates.com . Also see Capital Markets Assumptions Methodology at www.blackrock.com which analyses forward returns for equities into dividend yield, earnings growth, and "repricing".

Challenges in making dividend growth model MRP estimates

Issue	AER concern	Managing the concern	Comparison with HER approach
DGM is a perpetuity model	"it is a perpetuity model that has constant assumptions, but it is applied in an ever changing world".	All models are simplifications. This one is to estimate an average long term return which doesn't imply actual return is stable. Estimated MRP changes in response to market conditions.	HER assumes MRP is fixed despite strong evidence that MRP varies. In its own way, HER approach has constant assumptions that are applied in an ever changing world.
Quality of analyst forecasts	AER has evidence that forecasts are upward biased and /or sticky.	Financial market practitioners make decisions even though some of the data they receive is biased. Over the long term, dividends are flexible even if corporate behaviour is sticky in the short term.	HER does not reflect current market conditions so may be upward or downward biased compared to expectations of market participants.
Uncertainty over long term growth assumptions	A wide range of assumptions can be made about long term growth. This includes GDP growth, as well as extent to which there is return dilution from equity investment.	We do not know what economic growth will be, but can make reasonable assumptions about growth in productivity and factors of production. We can use consensus assumptions about these variables. We can vary assumptions and form a reasonable central case estimate.	HER estimates are contingent on an economy with a particular economic growth rate, equity investment, dividend payment. Expected returns should depend on these factors. For HER the expectations are implicit, not explicit.
Imprecision of estimates	The DGM can produce a wide range of MRP estimates depending on the input assumptions	Vary assumptions, use a range of models, approaches used by practitioners. The calibration approach proposed by ENA appears to have merit.	The HER approach using very long term averages gives false precision of returns over the medium term on which there is uncertainty.

Conclusions

- HER widely used as main estimate of MRP. One reason for this is that it appears that the estimate can be made with some certainty, whereas for other measures, there is uncertainty

- However, there is good information content in other measures, which estimate the variables required directly

- AER of course should continue to demonstrate that it is making sound estimates within a stable regulatory framework. But it has scope to make judgements, even where the data is uncertain

- Surely it is it better to be "roughly right" rather than "precisely wrong"? Isn't this the approach that is more consistent with its duty?

- We may currently be at a structural turning point in financial markets. Bond yields may have reached their nadir, central bank policy rates are set to rise possibly rather sharply, and there are risks to the inflation outlook. In these circumstances, doesn't the AER need to be able to review the full range of relevant evidence to ensure that it will be able to make determinations in the long-term interests of consumers?

Cross checks

AER Questions

- What is the role of cross checks?

- How can they be used transparently and predictably to promote confidence?

- What role can measures of financeability play?

- What information can we obtain from examining trading and acquisition multiples of the RAB?

- Our CRG has noted that regulated businesses have persistently outperformed our allowed return on equity. How might this be considered in setting the rate of return?

Financeability tests - context

What are financeability tests?

- To determine credit rating for a bond, rating agencies assess companies on a range of characteristics:
  - 60% of Moody's rating reflects qualitative characteristics, including the regulatory environment, asset ownership model, the size and complexity of the capital program, and financial policy
  - 40% reflects leverage and coverage ratios including net debt / RAB, and FFO/net debt
- In a financeability test, a financial model is used to project company financial ratios and assess the leverage and coverage ratios

Arguments for their use

- The argument put forward is that a network company financed at AER's notional gearing should have financial ratios consistent with an investment grade credit rating
- If this were AER's duty, it would imply that if a network company's financial ratios were expected to breach credit rating agency thresholds regulatory action would be needed to resolve, e.g.:
  - Change the allowed return so that financial ratios satisfy the required conditions
  - Change the profile of cash flows, e.g. by changing the depreciation policy

Caution with interpretation

- If projections for a notional company breach the threshold financial ratios for a notional company it would not necessarily lead to downgrade of the notional company:
  - The rating is not just about the financial ratios, but the overall characteristics of the company and the regulatory framework
  - Temporary breach of ratios do not necessarily lead to a downgrade
  - Rating agency opinions about thresholds for potential downgrades are published, but these are based on the actual companies, not companies financed at the notional gearing, limiting the inferences that can be drawn for a notional company

Financeability: not an indicator of WACC*

- AER's duty is to provide a return that is appropriate for a benchmark efficient entity (BEE)

- AER determines the notional capital structure for a BEE and uses it to **measure** the cost of capital. The cost of capital is not sensitive to changes in the notional gearing

- Actual companies choose their own capital structure, dividend policy based on capital investment and cash flow profiles

  - There is no requirement that the actual capital structure should match that of the BEE

  - Companies with higher investments likely to choose lower gearing and vice versa

  - Actual companies are not necessarily BEEs even if financed at the notional gearing

  - Companies can flex capital structure decisions in response to events

- A breach of a credit agency metric is not evidence by itself that the AER's assessment of the cost of capital for a business is too low. It could signify for example high capital investment profile, inappropriate debt structure, aggressive dividend policy

- **If AER were to undertake financeability tests to inform decisions on cost of capital, how would it use the information?**

Possible uses of financeability tests

- Well designed incentive mechanisms may impose risks on energy network companies

- A company may be well-financed assuming that it performs satisfactorily. However, it is possible that incentive mechanism may impose too much risk on individual companies

- Financeability metrics may help AER assess such risks to design mechanisms that have the desired incentives but without imposing volatility of cash flows with unnecessary rating risk

*These issues were discussed in greater length in CEPA's reports for the AEMC: *ISP Financeability, Final Report* (February 2021), and *ISP Financeability, response to submissions, April 2021*

EV to RAB multiples

Measuring EV / RAB

- Numerator - make adjustments for:
  - EV of non-regulated business
  - Market value of debt to be included in EV
  - Include all securities
- Denominator – make adjustments for:
  - Indexation of RAB to required date between price determinations
  - Known increases / decreases for regulatory adjustments / disallowances and increases for outperformance
- Adjust for the trailing average cost of debt
  - The trailing average approach gives companies the right to income streams over a ten-year period. In an environment of falling interest rates, this is a financial asset with a positive value, as interest rates rise it has a negative value.

Interpreting RAB multiples

- Only look at EV attributable to the regulated business, and associated RAB
- After the adjustments, this does measure the difference between expected returns on the asset (including those due to outperformance) and the investor required return. Returns on current business and growth opportunities can also be assessed
- This does not lead to a mechanical assessment that a regulator uses, but it provides a useful indicator of market views
- It is obvious that with an EV/RAB multiple of 0.5 we would have a problem to fix. Likewise, an EV/RAB multiple of 2x would be a problem. Between the extremes calculations, nuance and judgement are required
- Financial market practitioners are doing the calculations and making inferences all the time. Regulators can too

Consideration of persistent outperformance and the cost of equity

- The UK regulator, Ofgem, in its RIIO-2 price control determinations included an "outperformance wedge" to reflect experience of outperformance. This reduced the allowed return by 25bps

- The companies affected appealed to the CMA. The CMA agreed that there was information asymmetry and other factors had led to outperformance. But it ruled that Ofgem had taken numerous other measures to limit the impact of the information asymmetry, and that the outperformance wedge was not the appropriate way to deal with this

- While the regulatory framework in Australia is very different, the economic issues are similar

- The CMA considered that careful consideration of costs as part of the price control assessment would represent a more targeted approach. It agreed with the appellants that a blanked reduction in returns led to arbitrary and unfair impacts on different companies. It considered that it would have a detrimental impact on customers and incentives

- We think it likely that a careful consideration of the merits of an adjustment to the cost of equity in Australia would come to the same assessment as the CMA